

REMARKS

Claims 1-6, 8-12, 14, 35-42, 44, 45 and 47-66 are rejected; and that claims 15-34 and 67 are withdrawn from consideration as being directed toward a non-elected invention.

Applicants respectfully request the Examiner to examine claim 67 together with claims 1-6, 8-12, 14, 35-42, 44, 45 and 47-66 as indicated in paragraphs 3 and 4 at page 2 of the Office Action dated October 31, 2008.

Additionally, Applicants respectfully request the Examiner to acknowledge their claim for foreign priority and receipt of the certified copies of the priority documents (from the International Bureau). The certified copies of the priority documents are lodged in PAIR with a date of February 22, 2005.

Additionally, Applicants respectfully request the Examiner to return initialed Form PTO/SB/08 A & B (modified) for the Information Disclosure Statement filed May 9, 2005.

A copy of Form SB/08 is attached hereto for the Examiner's convenience.

Claims 1, 59, 60 and 64 have been amended to set the upper limit of the HF content to 5 mass%. This amendment finds support on page 57, line 17 to page 58, line 9, etc., of the specification.

Claim 66 has been amended to set the lower limit of the HF content to 0.01 mass%. This amendment finds support on page 57, line 17 to page 58, line 9, etc., of the specification.

Claims 1, 40 to 42, 44, 45, and 58 to 66 have been amended to replace the phrase "consisting essentially of" with "consisting of." This amendment finds support on page 59, line

1 to page 61, line 12; page 94, line 20 to page 97, line 6; and in the Examples of the present specification.

No new matter has been added. Entry of the amendments is respectfully requested.

Review and reconsideration on the merits are requested.

Claims 1-6, 8-12, 14, 35-42, 45 and 47-66 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,642,352 to Suzuki et al, or in the alternative as being obvious under 35 U.S.C. § 103(a). Claims 1-6, 8-12, 14, 35-42, 44, 45 and 47-66 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. 2001/0038976 to Tanabe et al. Claims 1-6, 8-12, 14, 35-42, 44, 45 and 47-66 were also rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,905,063 to Tanabe et al, or in the alternative as obvious under 35 U.S.C. § 103(a). The rejections over U.S. Patent 7,052,627 to Kezuka et al and U.S. Patent 6,250,317 to Nakayama have been withdrawn.

Applicants respond as follows.

A. U.S. Patent No. 6,642,352 to Suzuki et al.:

(1) Suzuki discloses a curable composition comprising an inorganic polymer compound or an organic polymer compound (A), and an organic solvent (B) (Claim 1 of Suzuki).

That is, the curable composition of Suzuki must contain a polymer,

In contrast, the removing solution of the present invention, which consists of HF, at least one member selected from organic acids and organic solvents, and optionally water, cannot contain a polymer. Accordingly, the solution of the present invention, which cannot contain a polymer, is not anticipated by Suzuki, which must contain a polymer.

(2) Suzuki states that the amount of organic solvent is in the range of 0.3 to 25 times by weight of the total of the polymer (A) and the organic solvent (B) (paragraph [0080] of Suzuki), and that the amount of the catalyst used is usually 0.0001-1 mol for one mol of the total amount of the polymer (A) (paragraph [0089] of Suzuki).

However, Suzuki nowhere specifically describes in what amounts the polymer (A) and the organic solvent (B) should be incorporated in the composition. Furthermore, the description in paragraph [0080] of Suzuki includes a range in which the amount of organic solvent is larger than the total amount of the polymer (A) and the organic solvent (B). However, the amount of organic solvent cannot exceed the total amount of the polymer (A) and the organic solvent (B). Therefore, this description of Suzuki is not understandable.

Hence, it is entirely unclear from the description of Suzuki in what amounts the hydrofluoric acid and organic solvent(s) should be incorporated. Moreover, because Suzuki includes no Examples using hydrofluoric acid, it is unclear whether hydrofluoric acid can be used.

A comparison of Examples 69 and 70 to Comparative Examples 42 and 43 of the present specification (as summarized in Table A below) shows that an excessively low concentration of hydrofluoric acid (0.003 mass%) results in a low etching amount, thus removing none of the resist, resist anti-reflection coating, and etching residue.; and that if the concentration of hydrofluoric acid is excessively high (8 mass%), the resist cannot be removed, and the item cannot be manufactured to a precise size.

Table A

			Ex.		Comp. Ex.	
			69	70	42	43
Components	HF	mass%	0.7	0.2	0.003	8.0
	Organic solvent	Kind	Acetic Acid			
		mass%	98.5	99.6	99.994	84.0
		Water	mass%	0.8	0.2	0.003
Treatment time		Min	0.7	3.0	2.0	2.0
Etching amount	SiC	Å	3.2	2.0	0.0	4.2
	SiN	Å	11.5	14.1	0.2	780.0
Etching amount ratio	SiN / Low-k film		0.6	0.4	0.1	0.2
Corrosion		Copper	A	A	A	A
Removability	Resist		A	A	C	C
	BARC		A	A	C	A
	Residues		A	A	C	A
Profile			A	A	-	C

As shown above, the use of HF in an amount within a specific range enhances etching properties. This is not obvious from the invention of Suzuki, whose object is to reduce metal from a curable composition, since Suzuki neither describes nor suggests about the amount of HE.

B. U.S. Application Publication No. US 2001/0038976 to Tanabe et al.:

(1) Tanabe '976 does not anticipate the amended claims because Tanabe '976 does not exemplify or otherwise disclose a remover solution consisting of HF, at least one selected from organic acids and organic solvents and water as an optional component. Namely, hydrofluoric acid is only referenced in Tanabe '976 in the "BACKGROUND OF THE INVENTION" section of the specification in the disclosure of "a fluorine acid-based remover solution containing hydrofluoric acid as the main component." Thus, it is not at all clear from Tanabe '976 whether hydrofluoric acid can be used in a rinsing solution. Certainly, there is nothing in the disclosure

and working Examples of Tanabe '976 which would lead one of ordinary skill to include HF in a rinsing solution, and especially no such description in Tanabe '976 which would rise to a level of anticipation.

(2) Tanabe '976 discloses a rinsing solution that comprises at least one selected from the group consisting of ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, and ethyl lactate (Claim 1 of Tanabe '976).

Tanabe '976 states that the solution may further comprise a water-soluble organic solvent in an amount of from 0 to 50% by weight (Claim 2 of Tanabe '976), and still further comprise a corrosion inhibitor in an amount of from 0.5 to 15% by weight (Claim 3 of Tanabe '976).

However, Tanabe '976 nowhere describes in what amount at least one selected from the group consisting of ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, and ethyl lactate as an essential component should be incorporated. That is, the total amount of organic solvent is not clear from the description of Tanabe '976.

As discussed above, hydrofluoric acid is only referenced in Tanabe '976 in the Prior Art section.

Even if a person skilled in the art considered incorporating hydrofluoric acid into the rinsing solution of Tanabe '976, it is not clear in what amount hydrofluoric acid should be used. Because Tanabe '976 describes "a . . . remover solution containing hydrofluoric acid as the main component" in the Prior Art section, a person skilled in the art attempting to incorporate

hydrofluoric acid into a rinsing solution would naturally believe that the amount of hydrofluoric acid in the rinsing solution should be 50% or more.

(3) In contrast, the solution of the present invention contains HF in an amount of 0.01 to 5 mass%. This is because, as shown in Table 1 above, an excessively low concentration of hydrofluoric acid (0.003 mass%) results in a low etching amount, thus removing none of the resist, anti-reflection coating, and etching residue; whereas when the concentration of hydrofluoric acid (8 mass%) is excessively high, the resist cannot be removed, and the item cannot be manufactured to a precise size.

(4) It is not clear from Tanabe '976 whether hydrofluoric acid can be incorporated into a rinsing solution. Even if a person skilled in the art can incorporate hydrofluoric acid into the rinsing agent, it is not clear from Tanabe '976 in what amount hydrofluoric acid should be used. Therefore, it is not obvious from Tanabe '976 that the excellent effect of the present invention can be obtained by using HF in a specific small amount.

C. U.S. Patent No. 5,905,063 to Tanabe et al.

(1) Tanabe '063 discloses a remover solution containing a salt (a) of hydrofluoric acid and a non-metal base, a water-soluble organic solvent (b), and water (c), and having a pH of 5 to 8. The remover solution of Tanabe '063 must contain a salt of hydrofluoric acid, and a non-metal base.

(2) In contrast, the removing solution of the present invention consists of HF; at least one member selected from organic acids and organic solvents; and optionally water.

That is, the amended claims exclude the remover solution of Tanabe '063 which further contains a salt of hydrofluoric acid and a non-metal base as essential components. Therefore, the amended claims are not anticipated by Tanabe '063. Moreover, because Tanabe '063 employs a salt of hydrofluoric acid and a non-metal base as essential components, there is no apparent reason which would lead one of ordinary skill to remove such components to arrive at a remover solution of the invention consisting of HF; at least one member selected from organic acids and organic solvents; and optionally water. Therefore, the present claims also are not obvious over Tanabe '063.

Withdrawal of all rejections and allowance of claims 1-6, 8-12, 14, 35-42, 44, 45, 47-66 and 67 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. Application No.: 10/525,249

Attorney Docket No.: Q86398

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CUSTOMER NUMBER

Date: December 8, 2009